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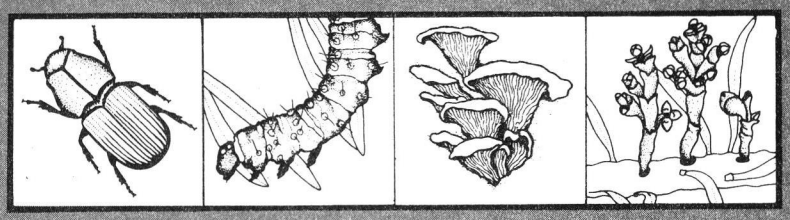
Forest Pest Management



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INSECT AND DISEASE SURVEYS OF SELECTED INLAND EMPIRE TREE IMPROVEMENT COOPERATIVE PLANTINGS AND SEED PRODUCTION AREAS

by

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ABSTRACT

Pests impacting height growth and causing some mortality in plantings selected for evaluation were western pine shoot borer, western spruce budworm, needlecast and needle blight infections, and stem rusts. Early detection of potential problems allow management approaches to be taken to prevent serious impacts.

INTRODUCTION

The Inland Empire Tree Improvement Cooperative (IETIC) is a group of Federal, State, and private agencies dedicated to selection and propagation of superior trees that produce more and better seed which will eventually result in improved planting stock. Members have pooled their resources and established test plantings, seed orchards, and seed production areas. Cooperative Forestry and Pest Management was asked by IETIC to evaluate pests in some of these areas. Several were visited by entomologists and pathologists in 1983 to determine the nature and extent of insect and disease problems.

OBJECTIVES

1. Identify insect and disease pests in selected IETIC test plantings, seed orchards, and seed production areas.

2. Make a preliminary estimate of pest levels and the effects on progeny evaluations and seed production they might have.

METHODS

Several plantings of each species were selected at widely scattered locations to represent a wide range of conditions. Individual planting examinations varied.

[1] Scientific names of insects and disease organisms are listed in the appendix. A summary table of insects and diseases is also included in the appendix.

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Areas checked by pathologists were sampled by a random perpendicular transect until at least 400 trees had been examined.

Areas checked by entomologists were sampled by either timed plots, that is meandering throughout the planting for 30 minutes; or by examining every tree on alternating rows.

Each tree was checked for damage, the damaging agents were identified if possible, and the amount and degree of damage was noted.

RESULTS

Progeny test plantings

Douglas-fir

Yaak/Kilbrennan, Kootenai National Forest, T33N, R33W, Sec. 32, Montana.--About 21 percent of the trees were infested with Cooley spruce gall adelgid;[1] no other problems were noted.

Little Guard, Idaho Panhandle National Forests, T51N, R4E, Sec. 8, Idaho.--About 5 percent of the current growth appeared to be affected by frost, and about 75 percent of the trees exhibited multiple shoots, caused by previous year's frost injury. Affected trees were bushy with no dominant leaders. No other pest problems were noted.

Meadow Creek, Nezperce National Forest, T30N, R4E, Sec. 26, Idaho.--About 50 percent of the trees exhibited Rhabdocline needlecast symptoms. Infection was severe on some trees. The Cooley spruce gall adelgid and the Douglas-fir needle midge were present but populations were low.

Grand Fir

Ruby Creek, Idaho Pine Timber Association, T61N, R1W, Sec. 17, Idaho.--No obvious insect or disease problems were noted; about 10 percent of the trees were dead from undetermined causes.

Tollgate, Nezperce National Forest, T29N, R3E, Sec. 27, Idaho.--About 10-20 percent of the trees were dead or missing. Pocket gopher evidence was conspicuous. Another 5-10 percent of the trees appeared to have been browsed by deer. Deer were seen in the plantation during the evaluation. Light defoliation, probably by the western spruce budworm was evident, but no larvae were seen.

Lodgepole Pine

Condon, Flathead National Forest, T21N, R17W, Sec. 36, Montana.--No obvious insect or disease problems were noted.

Meadow Creek, Nezperce National Forest, T30N, R4E, Sec. 26, Idaho.--Several trees had noticeably stunted needles, possibly caused by competition from surrounding vegetation. No obvious insect or disease problems were noted.

Camas Creek, Bitterroot National Forest, T4N, R21W, Sec. 6, Montana.--No obvious insect or disease problems were noted.

Dodge Creek, Kootenai National Forest, T37N, R29W, Sec. 26, Montana.--About 4 percent of the trees were infested with an unidentified aphid; no other problems were noted.

Savanec, Lolo National Forest, T19N, R30W, Sec. 27, Montana.--More than 84 percent of the trees had lodgepole pine needlecast; about 2 percent had western gall rust infections.

Lone Mountain, Idaho Panhandle National Forests, T53N, R4W, Sec. 27, Idaho.--About 25 percent of the trees were infested with western pine shoot borer; 7 percent were infected with western gall rust; and 7 percent were infected with lodgepole pine needlecast. This planting was examined on May 11. A subsequent visit to the planting on June 15 with Ray Hoff, Intermountain Forest and Range Experiment Station, showed the original examination was made too early. Hoff's data showed 18 percent of the trees were infected with western gall rust, and 93 percent were infected with lodgepole pine needlecast. In addition, he found 12 percent of the trees were infested with pitch nodule moth.

Ponderosa Pine

Condon, Flathead National Forest, T21N, R17W, Sec. 36, Montana.--About one-half the trees were examined; 46 percent of them were infested with western pine shoot borer. Other pests observed were pine sawfly and western gall rust; both were at inconsequential levels.

Meadow Creek, Nezperce National Forest, T30N, R4E, Sec. 27, Idaho.--This plantation was checked twice, late March and mid-July, in conjunction with a western pine shoot borer suppression project. Thirty six percent of the terminal shoots were infested by the shoot borer. Damage was mainly stunting of height growth, although occasional leaders were killed, and other terminals had been wind broken because of shoot borer-caused brittleness. About 10 percent of the trees were infested with aphids and another 2-3 percent were infested with spittlebugs.

Tensed, Idaho Department of Lands, T44N, R4W, Sec. 16, Idaho.--About 25 percent of the trees were infested with western pine shoot borer; no other problems were noted.

Lone Mountain, Idaho Panhandle National Forests, T53N, R4W, Sec. 27, Idaho.--About 33 percent of the trees were infested with western pine shoot borer; 5 percent had western gall; and 5 percent had lodgepole pine needlecast.

Rye Creek, Burlington Northern Timberlands, T3N, R19W, Sec. 25, Montana.--About 3 percent of the trees were infested with western pine shoot borer; 5 percent of the trees exhibited deer browsing damage.

Lubrecht, University of Montana, T13N, R15W, Sec. 13, Montana.--About 6 percent of the trees were infested with western pine shoot borer; 3 percent had comandra blister rust; and 3 percent exhibited rodent chewing.

Western Larch

Condon, Flathead National Forest, T21N, R17W, Sec. 36, Montana.--About 20-30 percent of the trees had been killed by winter-related conditions. Frost had heaved many seedlings completely. Others were partially heaved with much of their root systems exposed. Some of the partially heaved seedlings were just barely alive. Numerous trees were dead with no recognizable cause. This may be the result of winter drying. When crowns are above the snow but root systems are frozen, sunlight reflecting off the snow can desiccate tender young shoots. Grasshoppers were abundant in the plantation, but were feeding on other vegetation.

Blue Mountain, Lolo National Forest, T12N, R21W, Sec. 1, Montana.--About 43 percent of the trees were missing or dead from undetermined causes. An extremely harsh site is probably a contributing factor. No other problems were noted.

Alexander Creek, Kootenai National Forest, T31N, R30W, Sec. 24, Montana.--About 9 percent of the trees were infected with Meria needlecast; 12 percent were missing or dead from undetermined causes.

Lubrecht, University of Montana, T13N, R15W, Sec. 13, Montana.--Nearly 52 percent of the trees were infested with western spruce budworm; 34 percent were missing or dead from undetermined causes.

Western White Pine

Quartz Creek, Kootenai National Forest, T32N, R32W, Sec. 35, Montana.--Less than 2 percent of the trees were infected with white pine needle blight; 8 percent were dead from undetermined causes.

Seed Orchards

Ponderosa pine

Missoula Nursery, Montana Division of Forestry, T13N, R19W, Sec. 30, Montana.--Thirty five percent of the terminal shoots were infested by the western pine shoot borer. No other problems were noted.

Russell Bar, Bureau of Land Management, T27N, R1E, Sec. 23, Idaho.--About 2 percent of the terminal shoots were infested with the western pine shoot borer. Infested lateral shoots were conspicuous, indicating there may be a sufficient population in the orchard to build up to significant levels. Some trees had many needles on their lower branches clipped, resembling grasshopper feeding.

Western White Pine

Lone Mountain, Idaho Panhandle National Forests, T53N, R4W, Sec. 27, Idaho.--About 8 percent of the trees were infected with white pine needle blight; less than 2 percent had white pine blister rust.

Moscow Arboretum, University of Idaho, T39N, R6W, Sec. 13, Idaho.--Three insect pests were found feeding on cones. They were the cone worm, the lodgepole pine cone borer, and the western conifer seed bug. Cones on some trees were almost entirely infested, whereas other trees exhibited little injury. From 20-30 percent of the cones were destroyed or heavily damaged by insects.

Coeur d'Alene Nursery, Idaho Panhandle National Forests, T50N, R4W, Sec 3, Idaho.--Extremely heavy populations of western conifer seed bug nymphs and adults were observed feeding on both first and second year cones. As many as 8-10 seed bugs were seen on individual cones. Populations of this magnitude are capable of completely destroying cone crops.

Sandpoint, Idaho Panhandle National Forests, T57N, R2W, Sec. 21, Idaho.--Very little insect or disease-caused damage was noted in late July. However, entomologists from the Pacific Southwest Forest and Range Experiment Station reported seeing moderate populations of the ponderosa pine cone beetle infesting the white pine cones earlier in the season. They also found relatively high populations of overwintering cone beetles in the orchard in December.

Seed Production Areas

The only seed production areas visited were Wheeler Mountain, Campbell Creek, and Potato Hill, all on the Nezperce National Forest, in Idaho. No cones were produced in these areas in 1983, so an assessment of damage by pests was not possible.

DISCUSSION

So what? Here's what:

Some of these pests may be quite important in meeting the objectives of the test plantings, especially those that reduce height growth or cause mortality. Early height growth and survival are important rating characteristics in the IETIC scheme of selecting faster growing trees.

Pests that impact height growth, including top-kill, are western pine shoot borer, western spruce budworm, severe needlecast or needle blight infections, and stem rusts. Stem rusts also cause mortality.

Knowledge gained from surveys such as this is useful when action is needed to protect plantings from pest depredations. But susceptibility to attack by insects or disease pests may be heritable, and there is no reason to perpetuate this susceptibility. It is probably more appropriate to drop susceptible lines from the IETIC program.

Pests of seed orchards and seed production areas can thwart the purpose of the areas if cone losses become intolerable. Frequent surveys are needed to detect potential problems early enough to allow for management approaches to be taken to prevent serious impacts.

RECOMMENDATIONS

Monitoring of selected test plantings, seed orchards, and seed production areas should continue to better define problem areas in which pests are of greatest concern. Pest Management specialists should determine the most susceptible areas and tree species and develop methods for assessing pest populations and associated impacts. Test planting, seed orchard, and seed production area managers should then be trained to assess potential problems and how to respond to them.

APPENDIX

Common and Scientific Names of Pests Mentioned in Text

Comandra blister rust	*Cronartium comandrae* Pk.
Cone worm	*Dioryctria* sp.
Cooley spruce gall adelgid	*Adelges cooleyi* (Gillette)
Douglas-fir needle midge	*Contarinia pseudotsugae* Condrashoff
Lodgepole pine cone borer	*Eucosma rescissoriana* Heinrich
Lodgepole pine needlecast	*Lophodermella concolor* (Dearn.) Darker
Meria needlecast	*Meria laricis* Vuill.
Pine aphids	*Cinara* sp.
Sawflies	*Acantholyda* sp.
Pitch nodule moth	*Petrova* sp.
Ponderosa pine cone beetle	*Conophthorus ponderosae* Hopkins
Rhabdocline needlecast	*Rhabdocline pseudotsugae* Syd.
Spittlebugs	*Aphrophora* sp.
Western conifer seed bug	*Leptoglossus occidentalis* Heidemann
Western gall rust	*Endocronartium harkenssii* (J. P. Moore) Y. Hirats.
Western pine shoot borer	*Eucosma sonomana* Kearfoot
Western spruce budworm	*Choristoneura occidentalis* Freeman
White pine blister rust	*Cronartium ribicola* Fisch.
White pine needle blight	*Lecanosticta* sp.

Summary of Insects and Diseases by Host

Douglas-fir

Cooley spruce gall adelgid
Douglas-fir needle midge
Rhabdocline needlecast

Grand fir

Western spruce budworm

Lodgepole pine

Lodgepole pine needlecast
Pitch nodule moth
Western gall rust
Western pine shoot borer

Ponderosa pine

Comandra blister rust
Lodgepole pine needlecast
Pine aphids
Sawflies
Spittlebugs
Western gall rust
Western pine shoot borer

Western larch

Meria needlecast
Western spruce budworm

Western white pine

Cone worm
Lodgepole pine cone borer
Ponderosa pine cone beetle
Western conifer seed bug
White pine blister rust
White pine needle blight